

REMARKS

Claim 6 is canceled herein and claim 1 is amended. Claim 1 is amended to more clearly define the invention. Support for the amendment of claim 1 is found, for example, in the original claims, namely claim 6, and on page 11, lines 16-21 of the specification. Upon entry of the Amendment, claims 1-5 and 7-14 will be all of the claims pending in the application.

I. Drawings

Box 10 on the Office Action Summary sheet indicates that the drawings filed on April 11, 2001, are accepted. However, on page 2 of the Office Action the drawings are objected to due to an apparent typographical error. The Examiner states that “PIPES 1, 6” in Figure 1C should be “PIPES 3, 6”.

Applicants submit herewith corrected/formal drawings thereby obviating the objection. Accordingly, Applicants respectfully request withdrawal of the objection.

II. Examiner Interview

Applicants submit the following as a summary of discussion during the telephonic interview on February 5, 2003, with Examiner Nguyen and George Fourson, a primary Examiner in the same art unit. During the Interview, the rejection under 35 U.S.C. § 112, 1st paragraph and the rejection under 35 U.S.C. § 103 were discussed.

In regard to the rejection under 35 U.S.C. § 112, 1st paragraph, Applicants pointed out where the Amendment to claims 1 and 8 was supported in the specification as in the Amendment filed on August 13, 2002. The Examiner agreed that the Amendment was in fact supported by the specification and indicated that the rejection would be withdrawn.

In view of our argument with respect to the rejection under 35 U.S.C. § 103, the primary Examiner agreed that the rejection under 35 U.S.C. § 103 was improper since the element of starting a supply of the reaction gas at a second flow rate while the supply of the first reaction gas at said first flow rate continues in claims 1 and 8 had not be taken into consideration in making the rejection under 35 U.S.C. § 103. Thus, the Examiner indicated that the rejection under 35 U.S.C. § 103 would be withdrawn.

III. Claim Rejections Under 35 U.S.C. § 103

Claims 1-14 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Applicants' admitted prior art in view of Gupta et al and Li et al.

The Examiner relies on pages 1-4 and Figures 2A-E and 5 of the present specification for the teaching of a prior art method of forming a film comprising starting a supply of a reaction gas comprising one of SiH_4 , SiF_4 or TEOS at a first flow rate into a chamber in which a plasma is formed, such that an initial film is formed on the wafer; and starting a supply of the reaction gas at a second flow rate while the supply of the reaction gas at the first flow rate continues. The Examiner recognizes that in the discussion of the prior art in the present specification, the claimed step of supplying the reaction gas at a second flow rate into the chamber after supplying the reaction gas at a first flow rate while the supply of the reaction gas at the first flow rate continues is not disclosed.

To remedy this deficiency, the Examiner relies on Gupta et al which is said to disclose supplying a reaction gas at a second flow rate into the chamber after supplying the reaction gas at a first flow rate while the supply of the reaction gas at the first flow rate continues.

The Examiner further notes that neither the admitted prior art in the specification nor Gupta et al discloses a chamber wherein a first nozzle is provided on the chamber above a center region of the wafer and wherein second nozzles are provided on the sidewalls of the chamber above the same wafer as recited in claims 6 and 7.

To remedy this deficiency the Examiner relies on Li. It is the Examiner's position that it would have been obvious to one of ordinary skill in the art to combine the knowledge within the prior art and the teachings of Gupta and Li to enable the process of supplying the reaction gas at the first flow rate into the chamber via a first nozzle and supplying the reaction gas at the second flow rate into the chamber via second nozzles to be performed and further to improve deposition thickness uniformity.

In regard to the thickness recited in claim 8, the Examiner takes the position that the selection of the film thickness is obvious or a matter of routine experimentation.

Applicants respectfully traverse the rejection.

One object of the present invention is to suppress the degradation of break-down voltage of a gate insulating film formed in a center region of a wafer, which results when a film is initially formed from a peripheral portion of the wafer in a conventional forming method. In order to achieve this object, a first gas nozzle is provided above the center portion of a stage, and a second gas nozzle is provided above the peripheral portion of the stage. A small flow rate of reaction gas is supplied from the first gas nozzle and a large flow rate of reaction gas is supplied from the second gas nozzle. The supply of the reaction gas from the first gas nozzle is prior to

the supply of the reaction gas from the second gas nozzle such that a film begins to be formed from the center of the wafer.

Conventionally, the problem of break-down voltage occurs because the timing of the supply of the reaction gas is the same in the first gas nozzle and in the second gas nozzle.

The object of Gupta et al (USP 6,121,163), is to improve the film quality at the boundary of deposition films which are formed in a PECVD method (col. 1, line 60 to col. 2, line 32). In order to achieve the object, as described in claim 1 of Gupta et al, inactive gas and reaction gas are introduced so that the separation does not occur until the RF electric power becomes full power (the first step). The inactive gas and the reaction gas are introduced to cause separation after full power is achieved (the second step). As described in this claim 1, the film is not formed at the first step.

On the other hand, in the present invention, a film is formed at the first step in the center portion of the wafer to prevent the degradation of the break-down voltage of the gate insulating film in the center portion of the wafer. Gupta et al (USP 6,121,163), does not teach or suggest this critical element of the claimed invention, i.e., the necessity that the film is formed from the center portion of the wafer.

Li et al does not remedy the deficiencies of Gupta et al. Li discloses that the first gas nozzles are arranged around the periphery and directed towards the center of the substrate, (see Fig. 4 and col. 4, lines 7-9), and a center nozzle is coupled to a second gas source and a second gas feed line. Col. 3, lines 59-61. Therefore, Li teaches away from the claimed invention of starting a first supply of the reaction gas via a first nozzle provided on the center region of the

chamber above the wafer to form an initial film on the center region of the wafer. Thus, one of ordinary skill in the art would not have had a reasonable expectation of achieving the claimed invention view of the cited references.

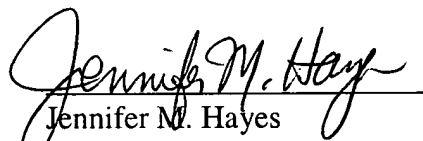
Accordingly, Applicants respectfully request withdrawal of the rejection.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


Jennifer M. Hayes
Registration No. 40,641

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE



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